CLAIMS

What is claimed is:

1. A system for forming a thin film resistor (TFR), comprising:

a substrate having a resistor material layer formed thereon, the resistor material layer formed from one of nickel chromium (NiCr) and nickel chromium aluminum (NiCrAl); and

a plasma etcher that etches the resistor material layer with a plasma etch chemistry to form the TFR.

2. The system of claim 1, the plasma etch chemistry comprising a mixture of chlorine (Cl_2) and boron tri-chloride (BCl_3).

3. The system of claim 1, the mixture of chlorine (Cl_2) and boron tri-chloride (BCl_3) having a mixture ratio of one of about 3:1, about 4:1, about 5:1, about 10:1 and about 20:1.

4. The system of claim 1, the plasma etcher further comprising a processing chamber that provides a magnetically enhanced environment during etching of the resistor material layer.

5. The system of claim 4, the magnetically enhanced environment having a magnetic field of about 45 Gauss to about 55 Gauss.

6. The system of claim 1, the plasma etcher further comprising a processing chamber that provides a low pressure environment in the processing chamber during etching of the resistor material layer.

7. The system of claim 6, the low pressure environment in the process chamber being about 5 mTorr to about 15 mTorr.

8. The system of claim 1, the plasma etcher etching the resistor material layer at a power of about 700 watts to about 1100 watts.

9. The system of claim 1, the substrate residing in a processing chamber of the plasma etcher, the processing chamber having an anode and a cathode operative to generate an electric field and create plasma, the processing chamber also having walls, at least one of the cathode and anode being set at a temperature of about 80°C to about 90°C and the walls being set at a temperature of about 60°C to about 70°C.

10. The system of claim 1, further comprising a measurement system that monitors spectral emissions from the plasma during the etching of the resistor material layer to determine when to halt the etching of the resistor material layer.

11. The system of claim 10, the spectral emission including chromium emissions.

12. A method for forming a thin film resistor (TFR), comprising:

forming a dielectric layer over a substrate;

forming a resistor material layer formed from one of nickel chromium (NiCr) and nickel chromium aluminum (NiCrAl) on the dielectric layer; and

etching the resistor material layer with a plasma etch chemistry to form the TFR.

13. The method of claim 12, the plasma etch chemistry being a mixture of chlorine (Cl_2) and boron tri-chloride (BCl_3), the mixture ratio of Cl_2:BCl_3 being one of about 3:1, about 4:1, about 5:1, about 10:1 and about 20:1.

14. The method of claim 12, further comprising exposing the resistor material layer to a magnetically enhanced low pressure environment during etching of the resistor material layer.

15. The method of claim 14, the magnetically enhanced low pressure environment having a magnetic field of about 45 Gauss to about 55 Gauss.

16. The method of claim 14, the magnetically enhanced low pressure environment having a pressure of about 5 mTorr to about 15 mTorr.

17. The method of claim 12, the etching the resistor material layer being at a power of about 700 watts to about 1100 watts.

18. The method of claim 12, further comprising monitoring plasma spectral emissions during etching of the resistor material to determine when to halt the etching of the resistor material layer.

19. The method of claim 18, the measured emissions comprising chromium emissions.

20. The method of claim 12, further comprising forming a capping layer over the TFR.

21. The method of claim 20, further comprising etching TFR vias in the capping layer with a sulfuric hexafluoride (SF_6) etch chemistry.

22. The method of claim 12, further comprising forming a dielectric layer over the TFR and etching TFR vias in the dielectric layer to expose ends of the TFR, and filling the TFR vias with a contact material to form TFR contacts.

23. A system for forming a thin film resistor (TFR), comprising:

means for plasma etching at least one of a nickel chromium (NiCr) and a nickel chromium aluminum (NiCrAl) resistor material layer formed on a substrate with a chemistry selective to the at least one of nickel chromium (NiCr) and nickel chromium aluminum (NiCrAl) to form the TFR; and

means for providing a low pressure magnetically enhanced environment for the plasma etching.

24. The system of claim 23, the plasma etch chemistry being a mixture of chlorine (Cl_2) and boron tri-chloride (BCl_3), the mixture ratio of Cl_2:BCl_3 being one of about 3:1, about 4:1, about 5:1, about 10:1 and about 20:1.

25. The system of claim 23, the magnetically enhanced low pressure environment having a magnetic field of about 45 Gauss to about 55 Gauss and a pressure of about 5 mTorr to about 15 mTorr.

26. The system of claim 23, further comprising a measurement system that monitors spectral emissions from the plasma during the etching of the resistor material layer to determine when to halt the etching of the resistor material layer.